MICROSOFT ACCESS – I

Technology Support
ShortCourse Handout

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Microsoft Access

Part-I

ShortCourse Handout

Introduction

Microsoft Access is a Relational database Management System (RDBMS), which stores and retrieves information according to Relationships you define. With Microsoft Access, you can create tables to store your information, queries to retrieve information from the tables, and forms and reports to make the information available to users in various ways. The database files you create in Access have an .accdb extension.

Access desktop databases can help you store and track just about any kind of information, such as inventory, contacts, or business processes. This handout will walk through the paths you can take to create an Access desktop database, add data to it, and then learn about next steps towards customizing and using your new database.

Course Objectives

After completing this ShortCourse, you should be able to:

- Create a New database;
- Create tables;
- Work on the two views of a table;
- Discuss basic database terminology;
- Discuss the basics of good database design;
- Work with an existing table;
- Work with an existing form;
- Sort and filter a table, and

- Print database objects.

What is an Access Database?

A database is collection of records and files that are organized for a specific subject or purpose. Without writing code or being an database expert you can:

- Use templates to build databases quickly.

- Easily find and report on data stored in Access.

- Create rich data entry forms.

- Import, transform, and export a variety of data sources.

You can use access to create databases such as:

- A telephone directory

- A timetable

- Address book

Getting Help

You can get help by pressing the F1 key, by clicking the question mark icon in the upper-right corner of the Access File menu, or by clicking the Help tab in the open database.

Designing and Documenting Your Database

Access Database consists of a collection of Tables, Queries, Forms, and Reports that you build to manage, analyze, and present your data. These identifiable units (components) are called Objects. These objects are dependent to other objects in the database. That is a Query, Form, or Report draws information from Tables so changing data in any of these objects changes the data in all these objects and the database.

Because the objects in a database are related to one another, building a database requires careful planning.

- Designer's best tools are a pencil and paper. It is important to plan what you are doing. If you don't plan, you will often have to start again.

- Document what you are doing. Spend some time and effort getting this right. If your underlying data structure is wrong then everything you do subsequently, will be much harder or may not function at all.
- Define the purpose. Consider questions you may want to answer in the future.
- Determine the tables (one for each subject) and kind of records it describe
- (people, projects, orders, etc.)
- Determine the fields – smallest piece of information.
- Identify unique field value (Primary key).
- Determine the relationships between tables.
- Test the design by entering sample data and run a simple query.

Follow the steps below when designing your database.

- Identify Tasks - make a list of all major tasks you want to accomplish. For example, "Enter Customer orders."
- Chart the Task Flow - group the major tasks by topic. For example, separate employee-related tasks and sales-related tasks.
- Identify Data Elements (Fields) - required by each task and required in calculation to make changes to the data.
- Organize the Data elements by subject, such as a group, place, thing, or action that you need to track (each subject requires several data elements called fields such as name, address, etc.)
- Create one table per Subject.
- Design a User Interface - such as forms, reports, etc.
- Test, review, and Refine the Database.

Terminology

- **Database** is a structured collection of information pertaining to a specific topic.
- **Database Objects** are database elements such as tables, queries, forms, and reports.
- **Database Relationships** are logical linking between tables. They are ties that are created between tables in the database so that Access can combine data from more than one table. The linking between two tables is called Join.

- **Field** is a space allocated for information about an object. It is the smallest unit of information you can retrieve from a database.

- **Foreign key** is the primary key in another table

- **Form** is an object designed and used for data input or display, one record at a time.

- **Null** is a missing value (commonly the result of human errors).

- **Primary key** is a field that uniquely identifies a record

- **Record** is a row of data in a table, which is a set of attributes as defined by schema.

- **Report** is an object designed and used for formatting, calculating, summarizing, and printing selected data.

- **Table** is an object you define and use to store data.

- **Query** is a request to retrieve specific information from a database.

Command Tabs

The following are some of the tabs and the commands available on each tab of the Ribbon. The tabs and the commands available change depending on what you are doing.

Command Tab	Common Actions for That Tab
Home	- Select different views - Copy and paste from the clipboard - Set fonts, spacing, fill color, etc. - Refresh, save, delete, total records - Sort and filter records - Find records
Create	- Blank tables - New tables with table templates - Forms - Reports
External Data	- Import data - Export data - Collect data and send data via e-mail
Database Tools	- Create and view table relationships - Run the Database Documenter or Analyze performance - Manage Access Add-Ins (Database Tools group)

Navigation Pane

When you open a database or create a new one, the names of your database objects appear in the **Navigation Pane**. The database objects include your **tables**, **queries, forms**, **reports**, **macros**, and **modules**. Use the "double less than" button ⟨⟨|, to Open/Close the Shutter Bar (Navigation Pane) or press the F11 key. You can also expand or contract the width of the Navigation pane by positioning your mouse pointer over the right edge of the Navigation pane and then clicking and dragging the edge in either direction to the width you want.

Use the **double headed up/down arrows** to expand/collapse the objects group. **Right-click the blank space** at the bottom of the Navigation Pane to perform a variety of tasks.
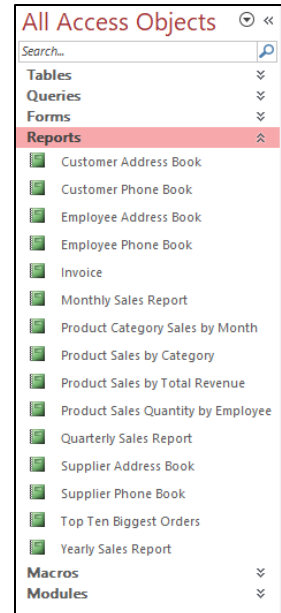
Finding Objects in a Database

- If the **Search Bar** does not automatically show in the Navigation pane, **Right-click** the **menu bar** at the top of the Navigation Pane and then click **Search Bar**.

- While you type text in the **Search…** box, Access searches within the selected category for any groups that contain an object or object shortcut that meets your search terms. Any groups that don't contain a match are hidden.

- **Type either a part or the complete name** of the object or shortcut in the Search Bar box. While you type characters, Access searches and eliminates any group headings that don't contain a match.

- To perform another search, press **BACKSPACE** to delete characters, and then type the new text for which you want to search.

Note: When you clear the Search Bar box, the Navigation Pane again displays all the available objects.

To Use Database Templates

- Once you open Access, **select a database** from the suggested templates on the **Home** page, such as Students, Asset Tracking, Contacts, etc.

- If the Home page does not provide the template you are needing, select **More Templates** to view all Access templates.

- Give the database a name (and change the file location if you wish) and then click the **Create** button.

- After your database is created, Access will open a Welcome menu to walk you through using that template. Click **Get Started** to remove this window.

- Use the Navigation Pane to see what's in your new database.

- You can then edit the tables and other objects as needed.
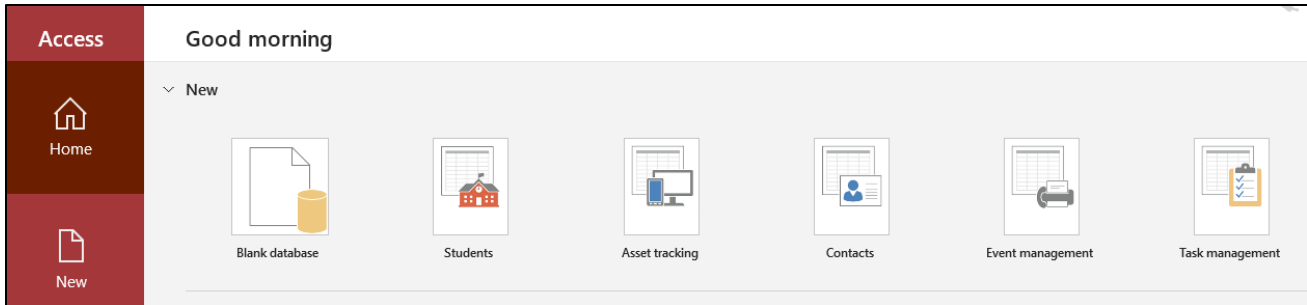
Creating a New Database

- From the **File** menu, click **New**, and then click the **Blank database** button.

- Click the **folder icon** to change the file where the database is saved.

- In the **File Name** box, type, **My Friends**, and then click **Create**.

- Access creates the database with an empty table named Table1, and then opens Table1 in Datasheet view. The cursor is placed in the first empty cell in the Click to Add column.

Creating a Data Table

- Make sure your **Fields tab** (within **Table Tools**) is active, then click the **View** button and choose the **Design View**.

- The Save As dialog box appears.

- Type, **Friends**, in the Table Name: box and then click OK.
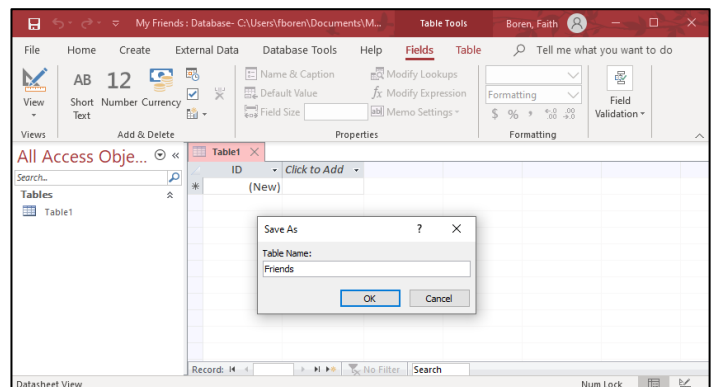
Creating Table Fields

- In Design View, click in the blank boxes beneath Field Name (immediately below ID—the Primary Key).

- Type the following fields names (columns names), pressing the Enter key (or tab key):

    o   First Name

    o   Last Name

    o   City

    o   State

    o   Zip

    o   Phone Number

Creating Records (Populating the Table)

- Click the **View** button, and then select **Datasheet View**.

- When the alert window appears, click the **Yes** button to save the table.

- Type the following data, pressing the **Enter or Tab key** once reaching the last field.

Notice how the cursor moves down to the (new) record after one row is populated and the Enter or Tab key is pressed. When you move on to a new record, Access automatically saves the previous record.

ID	First Name	Last Name	City	State	Zip	Phone Numl	Click to Add
1	Tom	Young	Lubbock	TX	79409	(806) 742-1650	
(New)							

Basic Table Design Rules

- Make each **record unique** – that is, DO NOT repeat the same kind of information in the same table.

- Make each **field unique**.

- Make each field **functionally dependent** - that is, all the information in a record should be related. If the field is not related to the subject, it should be in another table. Each field in the table should describe the table's subject.

- Make sure that data is broken down into its **smallest logical parts** (First name & Last name).

Naming Rules

- **Don't** give a table and a query the same name.

- **Capitalize** the first letter of every word, and then combine them to make a field name. For example: UnitsInStock.

- **Avoid spaces**. Spaces are allowed in Access field names, but they can cause problems. Consider using underscores instead.

- **Don't** use the field name; **Name**. Name is an Access keyword. Instead, use ProductName, or CategoryName.

- **Break Down** Your Information - You want to have each field store a single piece of information.

- **Avoid** Duplicating Information.

- **Avoid** Redundant Information – for Age and a DateOfBirth field, you'll want to include just a DateOfBirth field. Or for a DiscountPrice field (in a Products table), you should be able to calculate the discount price as needed based on a percentage.

- Include an **ID Field**. It's a good idea to get into the habit of using ID fields in all your tables. In some cases, your table may include a unique field that you can use as a primary key.

Notice: You cannot use the following characters in an Object name:

- o   Accent grave `
- o   Exclamation point !
- o   Period .
- o   Brackets []
- o   Question mark ?
- o   At sign @
- o   Slash /
- o   Back slash \
- o   Less than sign <
- o   Greater than sign >
- o   Asterisks *
- o   Pipe|
- o   Colon :
- o   Leading space
- o   Non-printable characters

Using the "Save As" Dialogue Box to Save a Copy of a Table

- While your database is open, expand the **Navigation pane**.

- Choose the "**Tables and Related Views**" from the Navigation pane to see All Tables.

- Open the **Order Details: table** (Double-click the table).

- Click the **File** button, and choose **Save As**.

- Click **Save Object As** (to save the current table as a new table).

- Click **Save As**. It will then prompt you to name your object.

- Click **Publish**.

You can Save As the following objects:

  - Tables

  - Queries

  - Forms

  - Reports

Note: to delete a table, using the Navigation pane, you must close the table first (if it is open).

The Primary Key

A primary key is a field or set of fields with values that are unique throughout a table. Values of the key can be used to refer to entire records because each record has a different value for the key. **Each table can only have one primary key**. Access can automatically create a primary key when you create a table, or you can what field you want to use as the primary key.

If your database doesn't have an ID field (perhaps because you created it using the Create Tables Table Design command), it's up to you to create one and set the primary key. Here's how to do it:

- In **Design View**, create a new field by typing a name in the **Field Name** column.

- In the **Data Type** column, choose **AutoNumber**. By choosing the AutoNumber data type, Access generates a unique ID value for every new record you insert. Or, you can choose the Text or Number data type. Then, you'll be entering your own unique value for each record.

- In Design View, **right-click the field**, and then choose **Primary Key**. Note: To make a primary key that includes more than one field, click the margin next to the field name, and then drag the mouse to select more than one field. Then, hold down the **CTRL** key and then **right-click** your selection. Now you can choose Primary Key.

What Kind of Primary Key Should You Use?

- **AutoNumber Primary Keys** - Can be set to automatically enter a sequential number as each record added. This is the simplest way to create the primary key.

- **Single-field Primary Keys** - Unique values such as ID Numbers or Part Numbers are set as the Primary key.

- **Multiple-field Primary Keys** - In many-to-many relationship you need to create a (Junction) table. Then, the Primary Keys from the two one-to-many tables together will be the primary key for this Junction table. Hold down the **Ctrl** key and using the field selector, **select both fields** to set the multiple primary key.

Data Types for Access Databases

When creating tables, you need to select a data type for each column of data. The **Short Text** data type is the default data type since it lets you enter almost any character (letter, symbol, or number). However, careful selection of data types can help you with data validation and functions and improves the accuracy of the information you are storing.

Field Name	Data Type
ID	AutoNumber
First Name	Short Text
	Short Text
	Long Text
	Number
	Large Number
	Date/Time
	Currency
	AutoNumber
	Yes/No
	OLE Object
	Hyperlink
	Attachment
	Calculated
	Lookup Wizard...

When to Use Which Data Type

Data type is a set of qualities that applies to all the values that are contained in the field. For example, values that are stored in a Text field can contain only letters, numbers, and a limited set of punctuation characters, and a Text field can only contain a maximum of 255 characters.

Sometimes, the data in a field may appear to be one data type but is another. For example, a field may seem to contain numeric values but may actually contain text values, such as room numbers. While in **Datasheet View** for the **Friends** table, select the **right-hand arrow** in the cells **under Data Type** to change your type of data for that field.

Overview of Basic Data Types Available in Access

Data Type	Usage	Size
Short Text (formerly known as "Text")	Alphanumeric data (names, titles, etc.)	Up to 255 characters.
Long Text (formerly known as "Memo"	Large amounts of alphanumeric data: sentences and paragraphs.	Up to about 1 gigabyte (GB), but controls to display a long text are limited to the first 64,000 characters.
Number	Numeric data.	1, 2, 4, 8, or 16 bytes.
Large Number	Numeric data.	8 bytes.
Date/Time	Dates and times.	8 bytes.
Currency	Monetary data stored with 4 decimal places of precision.	8 bytes.
AutoNumber	Unique value generated by Access for each new record.	4 bytes (16 bytes for Replication ID).
Yes/No	Boolean (true/false) data; Access stores the numeric value zero (0) for false, and -1 for true.	1 byte.
OLE Object	Pictures, graphs, or other ActiveX objects from another Windows-based application.	Up to about 2 GB.
Hyperlink	A link address to a document or file on the Internet, on an intranet, on a local area network (LAN), or on your local computer	Up to 8,192 (each part of a Hyperlink data type can contain up to 2048 characters).
Attachment	You can attach files such as pictures, documents, spreadsheets, or charts; each Attachment field can contain an unlimited number of attachments per record, up to the storage limit of the size of a database file. Note, the Attachment data type isn't available in MDB file formats.	Up to about 2 GB.
Calculated	You can create an expression that uses data from one or more fields. You can designate different result data types from the expression. Note, the Calculated data type isn't available in MDB file formats.	Dependent on the data type of the Result Type property. Short Text data type result can have up to 243 characters. Long Text, Number, Yes/No, and Date/Time should match their respective data types.
Lookup Wizard	The Lookup Wizard entry in the Data Type column in Design view is not actually a data type. When you choose this entry, a wizard starts to help you define either a simple or complex lookup field. A simple lookup field uses the contents of another table or a value list to validate the contents of a single value per row. A complex lookup field allows you to store multiple values of the same data type in each row.	Dependent on the data type of the lookup field.

Managing Field Sizes

You can change the field size by using the Field
Properties menu within Design View. Assign the field
size you need in the cell next to the Field Size property.
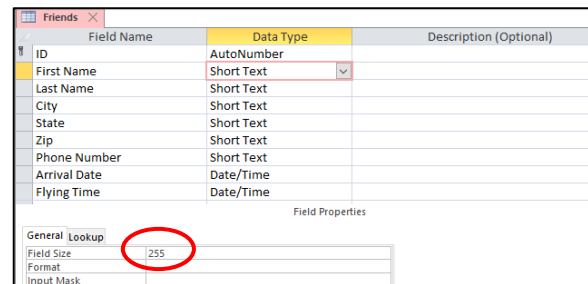
Recommended Maximum Field Sizes

- **First names and last names** - 25 characters should be adequate for a first name, while 50
  characters should account for long, hyphenated last names.

- **Middle initial** - One character.

- **Email address**- 50 characters.

- **Cities, states, and countries** - 50 is enough for most practical purposes.

- **Street address** - A street address consists of a number, followed by a space, then the street
  name, another space, and the street abbreviation (like Rd or St). 50 characters should be long
  enough, if you put postal codes, cities, and other postal details in separate fields.

- If you want to store the **phone number** like (888) 123-4567, make the field 11 characters long
  (ignoring the place holders). You can then store the phone number as 8881234567, but use an
  input mask, to add the parentheses, spaces, and dash when you display it.

Database Relationships

After you have set up different tables (one for each subject) in your Access database, you have to give
Access a way to bring that information back together again. You do this by **placing common fields in
tables that are related**, and by defining relationships between your tables.

- **Relationships work by matching data in the Key fields (Primary and Foreign keys).**

- **Relationships are logical linking between database tables.**

Note: you need to make sure that the related key fields have the same name, data type, and size in both
tables.

- Table relationships are the foundation upon which you can enforce integrity to help prevent
  orphan records in your database. An **orphan record** is a record with a reference to another
  record that does not exist. For example, an order record that references a customer record that
  does not exist.

Types of Relationships

- In a **One-to-One** relationship, each record in table A has only one matching record in table B. One-to-One relationships are uncommon!

- In **One-to-Many** relationship, each record in table A has many matching records in table B. This is the most common type of relationships.

- In **Many-to-Many** relationship, a record in table A has many matches in table B, and a record in table B has many matches in table A. This type of relationship is possible by defining a third table (called a junction table) whose primary key consists of two fields (the primary key s of both tables A & B) – (press the shift key & select both & press the key).
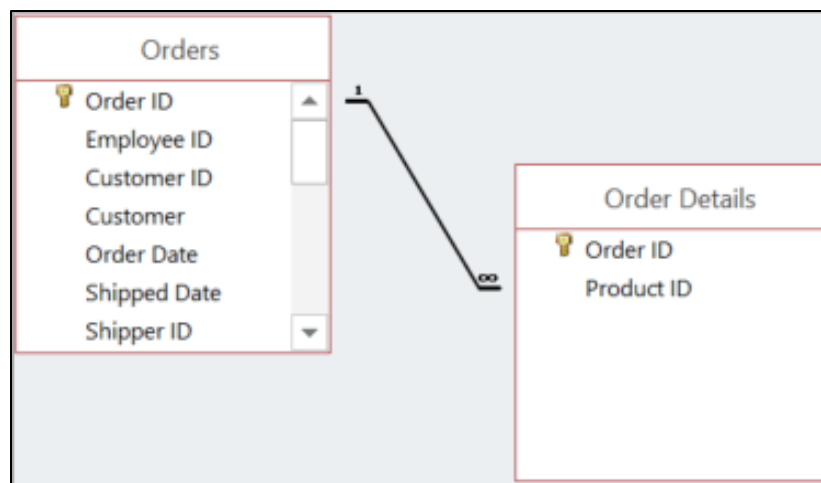

Creating Relationships and Enforcing Referential Integrity

Creating relationships allow you to pull together **related data from different tables**. They are also useful when you are creating forms, queries, and reports. To create a relationship, you should **have at least one field that is common in both tables.**

- Within the **Database Tools**, choose **Relationships** from the **Relationships Group**. All active relationships should be shown here.

- To create a relationship, **click-and-drag** the same fields in one table and drop it on the same field in another table (the **primary key**, and the **foreign key**).

- When the Edit Relationships dialogue box appears, select the **Enforce Referential Integrity**. Referential integrity is a system of rules that Microsoft Access uses to make sure that relationship between records in related tables are valid and that you don't accidentally delete or change related data. *If you change the field in one table, the field will be updated in all other tables in which relationships exists*. That is related fields should have:

- o   Same Name

- o   Same Data Type

- o   Same Field Size

- **Close** the Relationships window (for a new relationship, you would click **Create**).

- When you Relationship tab is open, use the **Relationships** group within the **Relationship Tools** to **add** and **edit** relationships.
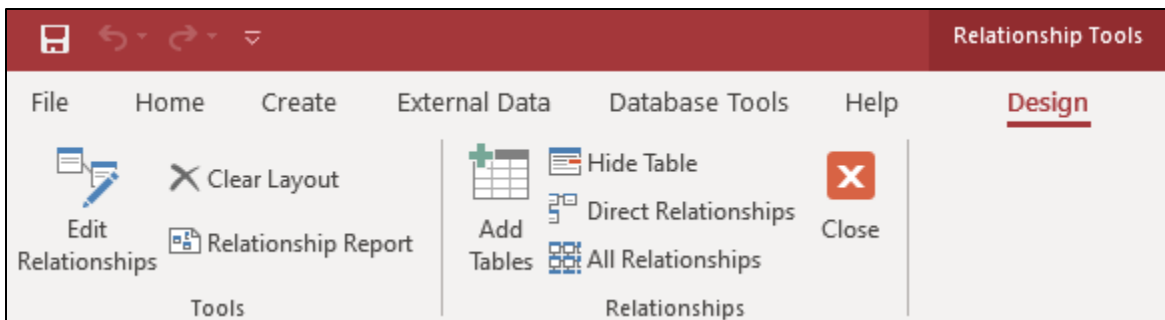
To Print the Relationships Report

- Choose the **Relationships command** in Relationships group on the Database Tools tab.

- Rearrange the Tables (your Relationship Report will print exactly as it appears on the screen).

- Choose the **Relationship Report** command in the Tools group on the Relationships Tools Design tab.

- **Modify** your page layout setting as necessary.

- Choose the **Print** command in the Print group on the Print Preview tab.

Practice Exporting Objects using the Northwind Traders Sample Database

- In the **Navigation Pane**, click the **arrow** on the **Tables tab**, and select **All Access Objects**.

- Expand the **Reports** object and select the **Customer Address Book** report.

- On the **External Data** tab, in the **Export** group, select the **More** drop-down button, and then choose the **Word** command.

- Browse and find a folder to save your file.

- Click **OK** (you can choose whether to save export steps).

- **Close** the Export-RTF file window.

- **Close** the Customer Address Book report (Right-click the tab > Close).

- On the **Navigation pane**, click the **Tables** object.

- Find and double-click the **Products** table, to open it.

- Click the **Excel** command on the **External Data** tab, on the **Export** group.

- Browse and find a folder in your computer to save this file.

- Check mark the "**Export data with formatting and layout**" box.

- Check mark the "**Open the destination file after the export operation is complete**" box.

- Click **OK**.

- Close the Excel file, and Excel program.

Using the Date Picker

When you place the cursor on a Date/Time field, the **Date Picker (calendar icon)** appears at either the
right or left sides of the field, depending on your computer language settings.
When you click the Date Picker, a calendar control appears.
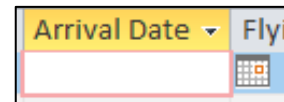
You can use the calendar to select a date or click Today to enter today's date. Note: If you use an input
mask for a Date/Time field, the Date Picker control is unavailable for use with that field.

Add a Date Field to the Friends Table

- Open the table in **Datasheet view**, and then click the **down arrow** next
  to **Click to Add** and select **Date & Time** from the drop-down field list.
  Repeat to add a second new field.

- **Double-click** the field headings and rename the new columns to **Arrival
  Date** and **Flying Time**, respectively. Switch to **Design view**.

- In the upper section of the design grid, **select the Date/Time field** (in
  the Data Type column) that you want to format.

- In the **Field Properties** section (bottom portion of the page), click within
  the **Format property box**, then select the drop-down arrow in the far
  right of the same box. Choose a format from the drop-down list. Repeat
  these steps for the second Date/Time field.

- Switch to **Datasheet view**, click **YES** to save the table.
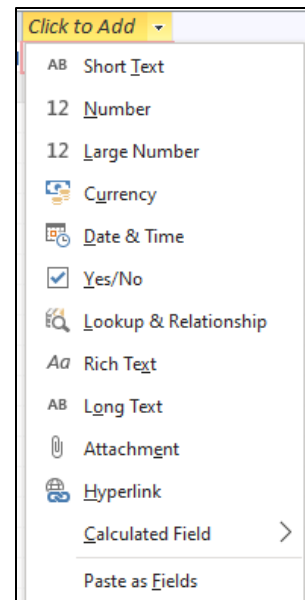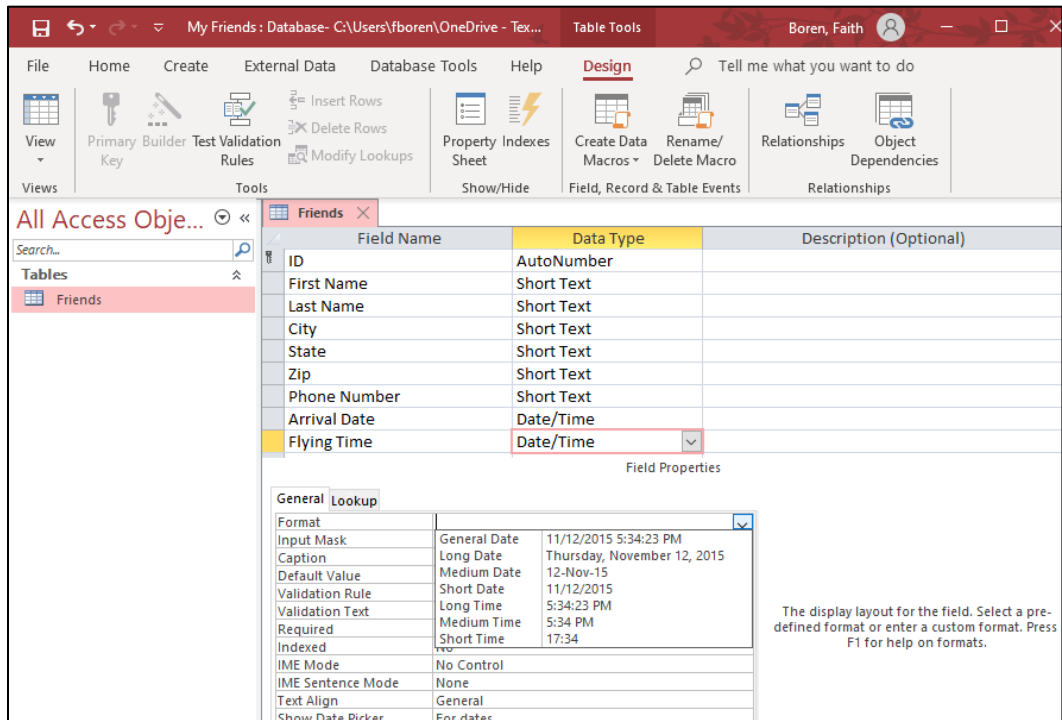
Adding Quick Start Fields

Quick Start fields in Access enable you to add fields you use regularly to your data tables with a simple click of the mouse. Instead of adding Address, City, State, ZIP, and Country codes one by one, for example, you can click the Address Quick Start field to add all the fields in one click.

- Access includes nine Quick Start fields by default: Address, Category, Name, Payment Type, Phone, Priority, Start and End Dates, Status, and Tag.

- To add a Quick Start field to your data table, open the data table you want to use and **click to select the field to the right** of the place you want to add the field.

- In the **Table Tools Fields** tab, click **More Fields** in the Add & Delete group.

- Scroll down to the bottom of the list to find the **Quick Start fields** and click the one you want to add to the data table.

- Each Quick Start field you add has preset field options already included. For example, when you add the Payment Type Quick Start field, the added field includes Cash, Credit Card, Check, In Kind, and
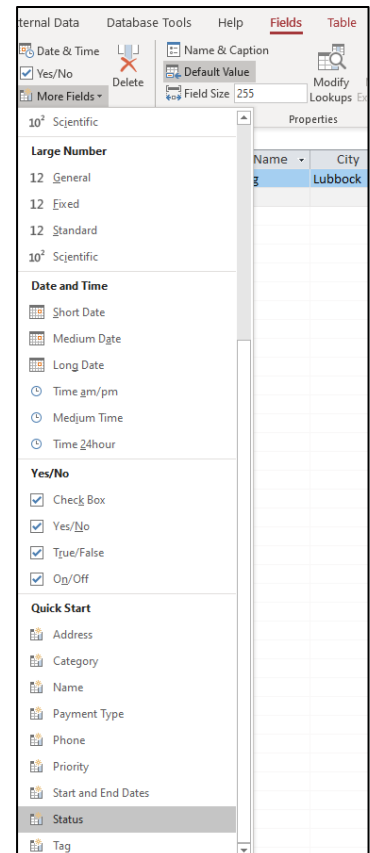
Debit selections as part of the field. You can **customize the field** to include the selections you want by **right-clicking the field** and choosing **Edit List Items**. You can modify, remove, or add values to the list by clicking and typing the new entry. Click OK to save your changes.

Adding a Quick Start Field to the Friends Table

- Select the **Click to Add** heading to highlight the column.

- Under Tables Tools, Fields, Add & Delete area, select the **More Fields drop-down**. Scroll until you reach the Quick Start Field options and select **Status**. A new Status field should be added to the left of the Click to Add column in your table.

- When you click the **drop-down arrow** in the first cell **under Status**, you will have the following default options: Not Started, In Progress, Completed, Deferred, Waiting.

- Change these options by **right clicking** in the Status column, selecting **Modify Lookups**, inputting your new options (i.e. Boarding, Departed, In-Flight, Landed, Delayed, Cancelled), then completing the Lookup Wizard steps until the process is finished.
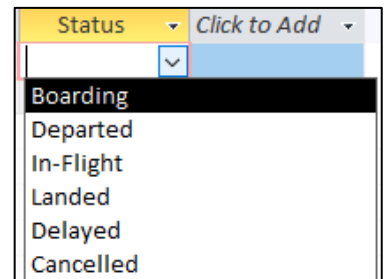
Moving Fields (Columns)

- On **Datasheet View**, click the column heading **Phone Number** to select the column.

- Place the curser on the selected column heading.

- **Click and drag** the column until a **thick black line** appears between the columns Last Name and City.

- On the Title Bar, click the **Save** icon.

- Close this table

Change the Default File Format

- From the **File** menu, click **Options**.

- In the Access Options dialog box, click **General**.

- Under Creating databases, in the Default file format for Blank Database box, **select the file**

   format you want as the default.

- Click OK.

Note: You cannot convert a database that uses an earlier format to a web database.
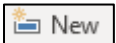

Creating Forms

- In the **Navigation Pane**, double-click the **Friends table** to select.

- Click the **Create** tab.

- Click the **Form** button, in the Forms group.

- A created form opens in Layout view.

- Once your form is created, you can then click between **Form**
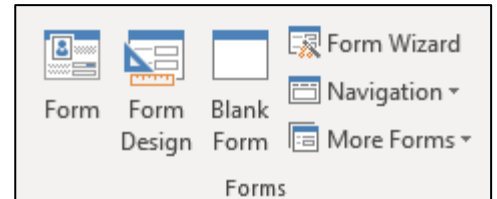
   View, **Layout View**, or **Design View** in the upper left-hand corner of the Form Layout Tools,

   Design tab.

Adding a New Record to the Table Using the Form

- Click the **View** button to switch to **Form View** of the form.

- Use the Form View to add another record to the Friends Table.

- In the **Records** group of the form window, **click** the   New   button.

TIP: If you see a Security Warning bar above the form, click the Options…button, click the Enable this
content radio button, and then click OK.

- **Click inside the boxes** in the form and type the data, pressing the TAB key to move from one box

   to another. When finished, the form should progress to a new, blank record. The old record has

   been saved.

- To **navigate** between the completed records, use the **record locator** at the bottom of the page.

   The arrows will take you to the next or previous record as needed.

Creating a Query using the Query Wizard

A **query** is a question you ask from a database. It's is a way of getting specific information from a database. You use queries to ask the database questions like, "Who are my friends in Texas?"

- Open the **Northwind Sample** Access database.

- **Double click** the **Invoices** table to make it active.

- On the **Create** tab click the **Query Wizard** in the Queries group.

- Select the **Simple Query Wizard** and then click OK.

- **Double-click** any field in the Available Fields: list to select the fields.

- Or click the [>] button to add one field to the Selected Fields: list.

- Click **Next**.

- When the final screen appears, type a name for your query.

- Click **Finish**. The query is automatically saved and executed.
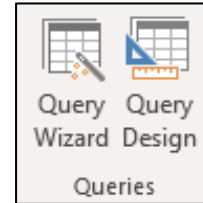
Query Criteria

A **query criterion** is like a formula and may consist of field references and operators (**operator**: a sign or symbol that specifies the type of calculation to perform within an expression). Query criteria are also called **expressions**.

When you want to limit the results of a query based on the values in a field, you use query criteria. A query criterion is an expression that Access compares to query field values to determine whether to include the record that contains each value.

Using a Comparison Operator to Specify Criteria

- Display the query in **Design View** (right-click the query tab/heading→ Design View).

- Click the **Criteria** box for the **Order ID** field.

- Click the **Builder** button in the Query Setup group.

- Click the appropriate comparison operator button, and specify the criteria **(> 70**, for example).

23
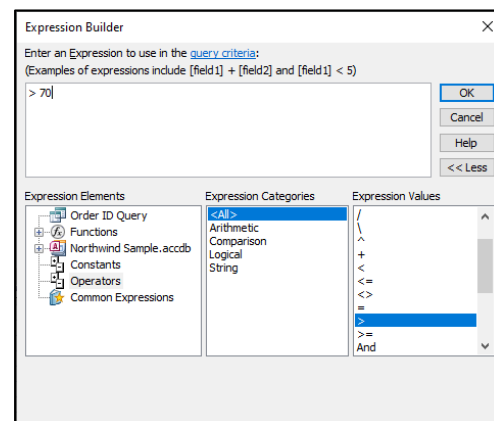
- To see additional comparison operator, expand the **Operators** element, and choose the Comparison Operator you want to use.

- Enter a value or click a field whose value you want to compare.

- Click **OK**.

- Be sure the **Show check box** is checked for each field that you want to show alongside your criterion field.

- Click the Run button
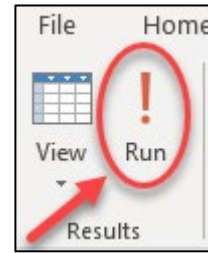
Examples of query Criteria for Numbers and Currency Fields

To include items that . . .	Use this criterion:	Query results returns items (records) where the unit price . . .
Exactly match a value, such as 100	100	Of the product is $100
Do not match a value, such as 1000	Not 1000	Of the product is not $1000
Contain a value smaller than a value, such as 99.99	<100 <=100	Is less than $100 (>99.99). The second expression displays items in which the unit price is greater than or equal to $100
Contain a value larger than a value, such as 99.99	>99.99 >=99.99	Greater than $99.99. The second expression displays items where the unit price is greater than or equal to $99.99.
Contain one of the two values, such as 20 or 25	20 or 25	Is either $20 or $25
Contain a value that falls within a range of values	>49.99 and <99.99 -or- Between 50 and 100	Is between (but not including) $49.99 and $99.99
Contain a value that falls outside a range	<50 or >100	Is not between $50 and $100
Contain one of many specific values	In(20,25,30)	Is $20, $25, or $30
Contain a value that ends with the specified digits	Like "*4.99"	Ends with "4.99," such as $4.99, $14.99, $24.99

Comparison Operators Used in Query Criteria or in Expressions

Operator	Meaning	Example
=	Equal to / Same as	= 5
<	Less than / lower than	< 5
>NOW()	After the current date	
>DATE()	Today or after	
<=	Less than or equal to	<= #6/1/2016#
>=	Greater than or equal to	>= #6/112016#
<>	Not equal to	<>5
And	And	>=50 and <= 100
Or	Or	TTU or Duke
Like	Test a text to match a pattern string	Like "Jon*"
Not	Logical not	Not >5
In	Test for any member in a list	In("CA", "OR", "WA")
Between	Test for a range of values	Between 1 and 5
Is	Used with Null to determine whether a value is Null or Not Null	Is Not Null

Using Wildcards in Queries

Note: with operators such as "Like," **wildcard** symbols are used to allow making complex searches for information easier. You can use the following wildcards:

*   Wildcard is used for any group of characters in this position.

              Example: B*ge finds Baggage, Barge, etc.

?   Wildcard is used for any single character in this position.

              Example: J?ne will find June and Jane

Wildcard is used for any single digit in this position.

              Example: 199# will find all years between 1990-1999

Creating Reports with the Report Wizard

- Select the **Create** tab, and then click the **Report Wizard** in the Reports group.

- Click the **Tables/Queries drop-down** arrow, and then select a **table** or a **query**.

- Click the ⟩⟩ button to move all the fields into the **Selected Fields** list.

- Click **Next** (three times).

- When the layout screen appears, select either Stepped, Block, or Outline.

- When the final screen appears, type a name for your report. Then click the **Preview** the report radio button.

- Click **Finish**. The report is automatically created, saved and opened.
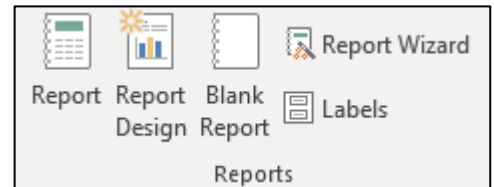
When is Data Saved?

When you edit data in a table or a form, **your changes are automatically saved** when you navigate to another record or when you close the table or the form.

To Back Up a Database

- Click the **File** menu, and then click **Save As.**

- Click **Save Database As,** choose the format you want to save in, and then click **Save As**.

Input Mask

An **Input Mask is used to pre-format a field to "Display/Store/Act" a certain way when a user inputs data**. For example, you could create an input mask for a Social Security Number field that automatically inserts the dashes. Input Mask specifies the way a user should enter data into the field. **It is a defined format for the field**. You can either quickly add input masks by using the **Input Mask Wizard** or specify masks **manually** by typing custom masks to the Input Mask field property setting. While the Input Mask Wizard provides input masks for most common formatting needs, you may sometimes want to customize input masks to better suit your needs.

Note: Input Mask Wizard only works with Text or Date field types.

To Add an Input Mask to a Table Field Using Predefined Masks

- Reopen the **My Friends** Access database.

- In the Navigation Pane, Right-click the Friends table, and then click **Design View**.

- Click in the **Phone Number** row.

- In the Field Properties area of the window, click in the **Input Mask** property.

- Click the **Build** button beside the Input Mask property

- In the Input Mask list, select the ⬚ button to choose the mask that you want to add.

General	Lookup
Field Size	255
Format	
Input Mask		
Caption	
Default Value	
Validation Rule	
Validation Text	
Required	No
Allow Zero Length	Yes

- Click **Try it** and enter data to test how the mask displays.

- To keep the input mask without any changes, click **Next**.

- Select an option for how you want the data to be stored.

- Click **Finish** and save your changes.

- On the Home tab, click View, then **Datasheet View**.

Validation Rules

A Validation rule is field specific rule that imposes a constraint that defines a set of values for a given field.

- You use Validation Rules to restrict your data to the way it will be accepted in one or several fields.

- You can **type** Validation Rules in or use the **Validation Rules Wizard.**

- Validation rules work hand in hand with Input Masks to prevent bad data entry.

- You create Input Mask or Validation Rules on the **Design View of a table**, in the General tab of the Field Properties.

Note: Don't specify a Validation Rule without Validation Text, since Access may generate an "Ugly" message that your users might not understand.

Here are some Examples:

Field Type	Validation Rule	Definition
Number	> 0	Must be greater than zero
Date	>=Date() or Is Null	Today's date, later, or blank

Validating Data During Entry in Table Fields

To apply field validation during data entry, **select the field**, and then navigate to the **Fields** tab, from Validation drop down list, click **Field Validation Rule**. You will reach Expression Builder dialog; here you can **write an expression** to validate the field entries.
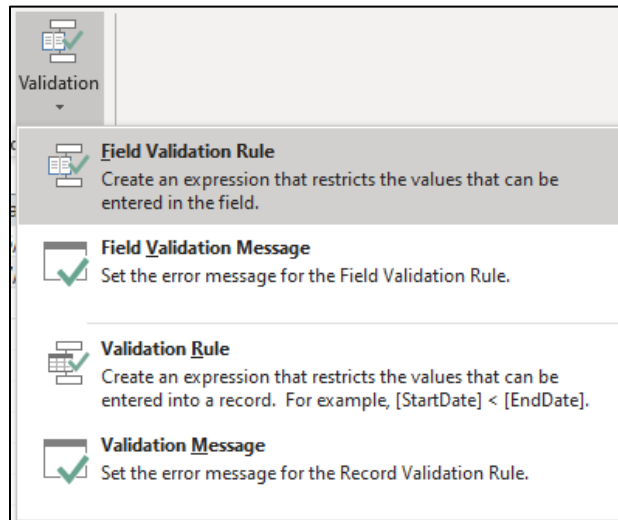
Recommended Online Resource

- Free online video training library at www.cbt.ttu.edu.

- TTU Safari e-Books at http://library.ttu.edu . More than 6000 Safari eBooks to access for four simultaneous users. Please use the log-out link when you are done using the database.

Please E-Mail your questions, comments, or suggestions to ITEducation@ttu.edu.

Class Exercises

Exercise 1

1. From the **File** menu, click **New**. By default, Blank Database is highlighted. In the **File Name** box, type **Sue's Wedding**, and then click **Create**. Access by default, creates a new table in Datasheet View called Table1 with an ID field already defined.

2. Click the **View** button, the **Save As** dialog box Opens.

3. Type **Guests List** for the table name, and then click **OK**. Guest List Table Opens in Design View.

4. Using the following table, type the table **field names** (see below image), choosing data type, description of each field, and pressing the **Enter** key each time

5. Make the **ID** field the **primary key** for this table (**Right-click** the field, and then choose Primary Key), if it is not already selected as the Primary key for this table.

6. When finished, **close** and **Save** this table.

7. Click the **Datasheet View** button on the Ribbon (View > Datasheet), to switch to Datasheet view.

8. **Enter the data** into the table (populate the table). Note: don't start typing in the middle of the table, since this is not an Excel spreadsheet.

9. When finished, **close** this table.

ID	Title	Last	First	Address	City	State	Zip	Invited	Expected	Group
1	Mr. and Mrs.	Baker	David	1234 Main	Dallas	TX	75200	2	Maybe	Groom's Family
2	Miss	Smith	Jane	1234 Main	Austin	TX	78711	2	Yes	Friends
3	Dr. and Mrs.	Mills	James	1234 Main	Fort Worth	TX	75100	2	Yes	Friends
4	Mr. and Mrs.	Hall	Tom	1234 Main	New York	NY	01002	2	Yes	**Bride's family**

Exercise 2

1. Click the **Create** tab on the Ribbon.

2. Click the **Table** button in the **Tables Group**.

3. On the **View** dropdown button, choose **Design View**, type: **City** for the table name, and then click **OK** to save the table as City. This table opens in Design View.

4. Using the following given table, **enter the table's field names**. Note: either keep the Flying Time field's data type "Short Text," or if you are choosing "Number" for this field's data type, then you need to format it as Decimal in the Field Properties section. Select **Format: Standard, and Decimal Places: 1.**

5. Make the **City** field the **primary key** for this table (Right-click the field, and then choose Primary Key), if it is not.

6. Click the Datasheet View button on the Ribbon, to switch to **Datasheet view**. Click **Yes** to save the table when prompted.

7. **Enter the data** (populate the table).

8. To format your table, on the **Home** tab, in the **Font** group, click **the Alternate Fill/Back Color** button, and then choose a color.
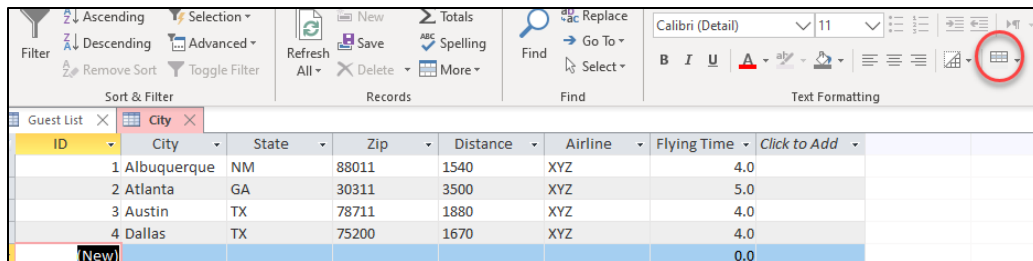
9. When finished, **close** the table.

City	State	Zip	Distance	Airline	Flying Time
Albuquerque	NM	88011	1540	XYZ	4.5
Atlanta	GA	30311	3500	XYZ	5.1
Austin	TX	78711	1880	XYZ	4.5
Dallas	TX	75200	1670	XYZ	4.3
Denver	CO	80100	1141	XYZ	2.4
Fort Worth	TX	75100	1670	XYZ	4.3
Los Angeles	CA	90035	678	XYZ	3.4
Nashua	NH	90030	2975	XYZ	6.2
New York	NY	01002	2840	XYZ	5.2
Phoenix	AZ	85000	1235	XYZ	3

Exercise 3

1. Click the **Database Tools** tab on the Ribbon.

2. On the **Relationships** group, click the **Relationships** button.

3. On the **Show Table** dialog box, click **ctrl + each table**, and then click the **Add button**. If you don't see your tables, click the **Show Table** button. When finished, click **Close**.

4. On the Relationships window, **click+ hold + drag** the common field, **City** (the primary key) from the City table to the common field in the other table (**Guests List**), and then release the mouse.

5. On the **Relationships** dialog box, check mark the **Enforce Referential Integrity** box, and then click **Create**.

6. Click the **Relationships Report** command, in the **Tools** group (on the Design tab) to see the **Print Preview** of your Report.

7. Click the **Close Print Preview** button.

8. **Close** any open windows.

9. **Close** the Program (Exit).